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TITLE: MOTOR STATOR AND ITS MANUFACTURE

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US-CL-CURRENT: 29/596,264/272.2

ABSTRACT:

PURPOSE: To improve the precision of dimension, by laminating adjacent steel sheets without metal processing such as calking and the like, and by filling up penetrated slots which are arranged at the both upper and lower ends of the steel sheets and on the outer and inner peripheries and in the axial direction, integrally with resin.

CONSTITUTION: In a metallic mold 3 for molding with resin, a center retaining pin 4 and a guide pin 5 for regulating a position for inserting a laminated core are arranged. In the mold 3, the rapped steel sheets of a desired quantity are inserted, and resin is injected, and a

resin-insulating section 6
and a resin- bonding section 7 are formed, and after the resin is hardened, the
laminated core 1 is taken out of the metallic mold 3. As a result, the
precision of dimension can be improved, and a space between a stator and a
rotor confronting with each other is uniformly arranged in the minimum size,
and the performance of a motor can be improved.

⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　昭61-293136

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H 02 K 15/02 1/18		D-7826-5H 7319-5H	

審査請求　未請求　発明の数 2　(全3頁)

⑤4発明の名称　モーター固定子およびその製造方法

⑳特　願　昭60-133230

㉒出　願　昭60(1985)6月19日

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明　細　書

1、発明の名称

モーター固定子およびその製造方法

2、特許請求の範囲

(1) 隣接する鋼板がカシメなどの金属加工により互いに固着されていない積層鉄心と、前記積層鉄心の上，下端に配置された樹脂部と、前記積層鉄心の内，外周及び軸方向の貫通穴に配置され、前記積層鉄心上，下端の樹脂部を連結する樹脂固着部とからなるモーター固定子。

(2) 積層鉄心の内周部に樹脂絶縁部材を一体成形した特許請求の範囲第1項記載のモーター固定子。

(3) 積層鉄心の外周部に樹脂絶縁部材を一体成形した特許請求の範囲第1項記載のモーター固定子。

(4) 隣接する鋼板をカシメなどの金属加工で互いに固着することなく積層鉄心を製作し、前記積層鉄心を樹脂成形金型内に挿入し、隣接する鋼板を位置決めした後、前記積層鉄心の上，下端に樹脂部を成形し同時に前記積層鉄心の内，外周及び軸方向の貫通穴に前記積層鉄心上，下端の樹脂部を連結する樹脂固着部を成形するモーター固定子の製造方法。

3、発明の詳細な説明

産業上の利用分野

本発明は積層鉄心を使用したモーター固定子に関する。

従来の技術

従来この種モーター固定子は第4図に示すように、積層鉄心1の隣接する鋼板が半抜きダボカシメ部2により互いに固着された構成になっている。

発明が解決しようとする問題点

しかしこのような構成のものでは、半抜きダボ凸部2aと半抜きダボ凹部2bとがカシメで嵌合する時互いに微少の相対ズレを伴うため積層枚数が増す程どズレが累積していき積層鉄心全体では大きな寸法誤差を生じモーター性能を低下させるという問題があった。

つまり、半抜きダボ凸部2aを半抜きダボ凹部2bに圧入する時半抜ダボ凸部2aが傾いたり、真円のまま変形しないことにより隣接する鋼板の

間に径方向および回転方向の相対ズレが生ずる。その結果積層鉄心1の内径，外径の真円度，同軸度に大きな誤差が生ずるため固定子と回転子の対向空隙を大きく設定せざるを得なくなり回転トルク等の性能低下をまねくものである。

そこで本発明は積層鉄心1の隣接する鋼板の相対ズレを防止し、モーター性能の向上を図るものである。

問題点を解決するための手段

上記問題点を解決するための本発明の技術的手段は、積層した鋼板の周囲および、貫通穴に成形した樹脂部のみで前記積層鋼板を固着することである。

作　用

この技術的手段による作用は次のようになる。すなわちバラ積み状態の積層鉄心を樹脂成形金型内に挿入、位置決めし、樹脂の一体成形で各鋼板を互いに固着するものであるが、隣接する鋼板の相対位置はガイドピンのガイドクリアランスの範囲内に確保され、固定子の寸法精度が向上される

10は巻線である。

発明の効果

以上、本発明は固定子の積層鉄心を樹脂の一体成形のみで強固に固着したものであるので、積層鉄心の寸法精度が向上し、固定子と回転子の対向空隙を均一かつ最少に設定できることからモーター性能の向上が可能となり、しかも次のような効果も奏する。

すなわち本発明では、樹脂固着部と同時に巻線部の樹脂絶縁層を一体成形することが可能なため、絶縁部材を組込む方式に比較して絶縁層を薄くかつ積層鉄心に密着させることができるためより強力な磁場が得られ、その分固定子を小型，軽量化することも可能である。

4、図面の簡単な説明

第1図は本発明の一実施例におけるモーター固定子の要部断面図、第2図は同固定子の樹脂成形金型の断面図、第3図は本発明の他の実施例におけるモーター固定子の要部断面図、第4図aは従来のモーター固定子の要部断面図、第4図bは同

ものである。

実　施　例

以下本発明の一実施例を添付図面にもとづいて説明する。第2図において、3は樹脂成形金型である。この金型3には積層鉄心挿入位置規制のセンター保持ピン4とガイドピン5が配置されている。6は樹脂絶縁部、7は樹脂固着部、8，9はエジェクターピンである。

積層鉄心1は金型3に挿入されるとセンター保持ピン4とガイドピン5により挿入位置が規制され、隣接する鋼板の相対ズレはガイドクリアランス以内の範囲に確保される。型閉が完了すると積層鉄心1は完全に位置が確定し、一体成形で樹脂絶縁部6と樹脂固着部7が形成されると積層鉄心1の各鋼板は互いに強固に固着される。

次に本発明の他の実施例について説明する。第3図は他の実施例を示しており、この実施例では、樹脂絶縁部6を積層鉄心1の外周部まで延長し積層鉄心1を樹脂で包囲することにより、樹脂の固着力向上を図ったものである。なお第1図に示す

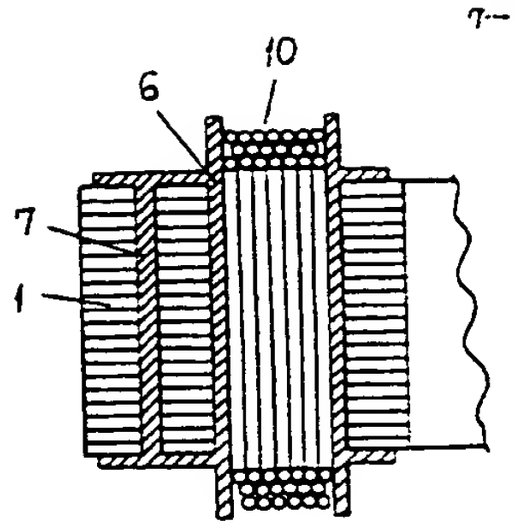
拡大断面図である。

1……積層鉄心、2……半抜きダボカシメ部、7……樹脂固着部。

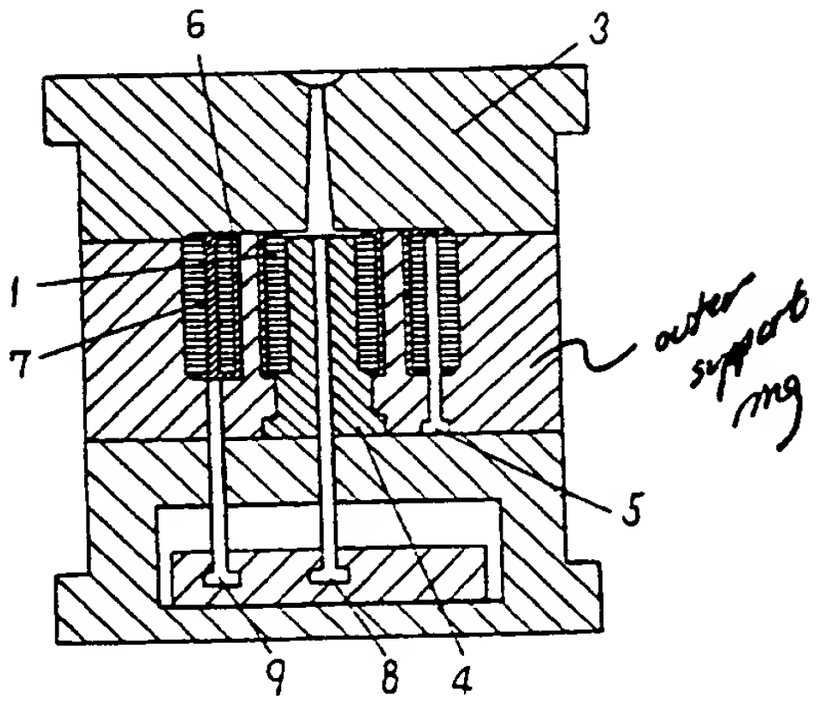
代理人の氏名　弁理士　中　尾　敏　男　ほか1名

第 1 図

1—積層鉄心
7—樹脂固着部

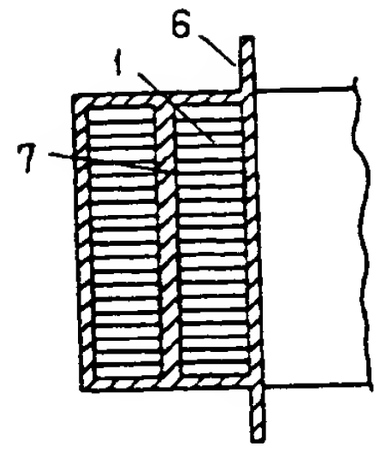


第 2 図

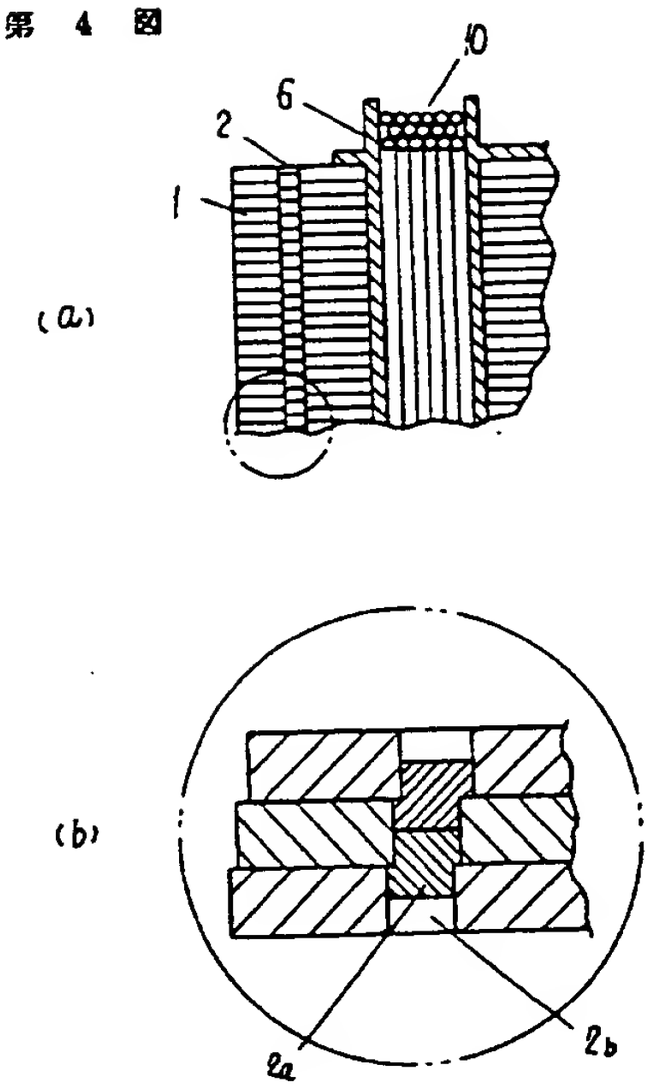


第 3 図

1—積層鉄心
7—樹脂固着部



第 4 図



English Translation of JP Published Application No. JP61293136 and Statement of Accuracy

STATEMENT OF ACCURACY

I, the below named translator, hereby declare that:

My name and post office address are as stated below;

That I am knowledgeable both in the English and Japanese languages, and that I believe the English translation of the following patent is a true and complete translation:

Title of Invention: MOTOR STATOR AND ITS MANUFACTURE

Patent No.: JP61293136

Publication Date: December 23, 1986

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Date: January 14, 2003

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(54) Title of Invention: MOTOR STATOR AND ITS MANUFACTURE

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(22) Application Date: June 19, 1985 (Showa 60)

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Specification

1. Title of Invention

Motor Stator And Its Manufacture

2. Claims

(1) A motor stator comprising a laminated steel core in which adjacent steel sheets are not bonded to each other by metal processing means such as caulking, having resin parts arranged at the upper and lower ends of said laminated steel core, and having resin bonding parts that are arranged at the inner and outer peripheries of said laminated steel core and through holes in the axial direction, which join the resin parts of the upper and lower ends of said laminated steel core.

(2) A motor stator described in Claim in which the resin insulating member is a single piece, molded at the inner periphery of the laminated steel core.

(3) A motor stator described in Claim 1 in which the resin insulating member is a single piece, molded at the outer periphery of the laminated steel core.

(4) A method of manufacturing a motor stator in which a laminated steel core is created without bonding adjacent steel sheets to each other by metal processing means such as caulking, where said laminated steel core is inserted into a resin mold die, and after the adjacent steel sheets are positioned, resin parts are molded at the upper and lower ends of said laminated steel core, and resin bonding parts linking the resin parts of the upper and lower ends of said laminated steel core are simultaneously molded at the inner and outer peripheries of said laminated steel core and through holes in the axial direction.

3. Detailed Explanation of the Invention

Field of Industrial Application

The present invention relates to a motor stator that uses a laminated steel core.

Prior Art

As shown in FIG. 4, conventional motor stators of this type have a structure in which the adjacent steel sheets of the laminated steel core 1 are bonded together by a half die cut dowel caulking part 2.

Problem To Be Solved by the Invention

However, with this type of structure, there were problems in that, when a slight relative misalignment occurs, and the half die cut dowel protrusion part 2a and the half die cut dowel indentation part 2b are engaged by caulking, the misalignment accumulates as the number of laminations increases, and a large dimensional error occurs in the laminated steel core overall, causing motor performance to degrade.

That is, when the half die cut dowel protrusion part 2a is press fit into the half die cut dowel indentation part 2b, the half die cut dowel protrusion part 2a tilts and/or remains round without changing shape, so relative misalignment can occur in the radial direction and the rotational direction between the adjacent steel sheets. As a result, large errors occur in the roundness and concentricity of the outer diameter and inner diameter of the laminated steel core 1, which forces setting a large gap between the stator and the rotor, leading to poor performance such as a reduction in rotational torque.

Therefore, the present invention attempts to prevent the relative misalignment of the adjacent steel plates of the laminated steel core 1 and improve motor performance.

Means To Solve the Problem

The present invention's technical method of solving the aforementioned problem is to bond the aforementioned laminated steel sheets only by molding resin parts at the periphery of the laminated steel sheets and through holes.

Action

The steps involved in using the method are as follows. Specifically, laminated steel core in a bulk condition is inserted into and positioned in a resin mold die, and the steel sheets are bonded to one another by a single molded piece of resin, and the relative positions of the adjacent steel sheets are kept within tolerance by use of a guide pin, thus improving the dimensional precision of the stator.

Embodiments

An embodiment of the present invention will be explained below based on the attached drawings. FIG. 2 shows a resin mold die 3. Arranged in die 3 are a center holding pin 4 and a guide pin 5 which controls where the laminated steel core is inserted. 6 is a resin insulating part, 7 is a resin bonding part, and 8 and 9 are ejector pins.

When laminated steel core 1 is inserted into die 3, the position is controlled by center holding pin 4 and guide pin 5, and the relative

misalignment of the adjacent steel sheets is ensured to be within tolerance. Once the mold closes, laminated steel core 1 is held firmly in position, and when the resin insulating part 6 and the resin bonding part 7 are formed through a single molding, the steel sheets of the laminated steel core 1 are firmly bonded together.

Another embodiment of the present invention will be explained. FIG. 3 shows this embodiment, in which, by extending the resin insulating part 6 to the outer periphery of the laminated steel core 1 and surrounding laminated steel core 1 with resin, resin bonding capability was improved. Note that 10 shown in FIG. 1 is a coil.

Effects of the Invention

As described above, in the present invention, the laminated steel core of the stator is firmly bonded only by a single molding of resin, so the dimensional precision of the laminated steel core improves, and it is possible to set the gap between the stator and the rotor to be uniform and minimal, so it is possible to improve the performance of the motor, and the following effects are also exhibited.

Specifically, with the present invention, it is possible to mold the resin insulating layer of the coil part in one piece simultaneously with the resin bonding part, providing a thinner lamination layer and closer adherence to the laminated steel core than in the prior method of assembling the insulating members, so a stronger magnetic field can be achieved, and the stator can be made commensurately more compact and lightweight.

4. Brief Explanation of the Drawings

FIG. 1 is a cross-sectional drawing of the main part of the motor stator in an embodiment of the present invention, FIG. 2 is a cross-sectional drawing of the resin mold die of the same stator, FIG. 3 is a cross-sectional drawing of the main part of the motor stator in another embodiment of the present invention, FIG. 4a is a cross-sectional drawing of the main part of a conventional motor stator, and FIG. 4b is an enlarged cross-sectional drawing thereof.

1 Laminated steel core
2 Half die cut dowel caulking part
7 Resin bonding part

Agent: Nakao, Toshio, Patent Attorney and one other party

FIG. 1
1 Laminated steel core
7 Resin bonding part

FIG. 2

FIG. 3

1 Laminated steel core

7 Resin bonding part

FIG. 4